

**HIGH-PERFORMANCE  
SERVER ARCHITECTURE, METHODS, AND SOFTWARE  
FOR SPATIAL DATA**

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**Related Application**

This application is a continuation of U.S. Patent Application Serial No.:  
09/694,117, which was filed on October 20, 2000, <sup>now U.S. Patent No. 6,604,046,</sup> which is a continuation of U.S.  
15   Provisional Application 60/160,561 which was filed on October 20, 1999. These applications are incorporated herein by reference.

**Technical Field**

The present invention concerns servers and related methods for handling map or spatial data.

20                                   **Background**

The use of digital map or spatial data is vital to the success of companies in many industries. For example, telecommunications companies use spatial data to locate bottlenecks and breakdowns in telephone networks; trucking companies use it to determine optimal routing of their tractor-trailer trucks; and even the United States Army  
25   uses it to manage troop deployments and supply operations for national defense.

As recently as ten years ago, most of the computer products that made it possible to use map data were specialized, stand-alone computer systems with specialized mapping (map-data-handling) software running on the same computers that store the map data. The mapping software generally allowed users to interact with displayed maps by,  
30   for example, zooming on specific map regions. Though useful, these computer systems, known as single-tier systems, were both expensive to purchase and expensive to operate. Indeed, their expense put them beyond the reach of many businesses.